

REMARKS

Claims 1, 2, 4-8, 10-17, 19-23 and 56-73 are pending in the application and are currently rejected. Claim 23 has been amended. Claim 21 has been cancelled. In light of the amendments and remarks herein, reconsideration of claims 1, 2, 4-8, 10-17, 19-20, 22-23 and 56-73 is respectfully requested.

Amendments to the Claims

While Applicants believe that the previously presented claims are patentable over all of the art cited in the Office Action as well as all other references submitted by Applicants, the claims have nonetheless been amended as follows in order to expedite the application toward allowance. The amendments are therefore made without prejudice or disclaimer, and Applicants reserve the right to pursue the original scope of the claims as provided prior to the cancellation or amendments, such as through continuation practice.

Claim 23 is amended to provide the antecedent basis for the term “phase change.”

As such, the amendments to claim 23 do not add any new matter.

Information Disclosure Statement

The Applicants acknowledge the Examiner’s comment regarding the information disclosure statement filed February 4, 2004 and will resubmit the affected portions and corresponding references under separate cover.

Claim Rejections under 35 U.S.C. § 112

Claim 21 stands rejected for failing to particularly point out and distinctly claim the invention. Claim 21 has been cancelled.

Claim 23 stands rejected as indefinite, because a phase change material has not been cited. Claim 23 has been amended accordingly. (The Applicants presume that the Examiner is referring to the lack of an antecedent basis in the claim. If the Examiner is referring to a lack of

citation in the specification, the Applicants note that the specification provides examples of a phase change substance such as “ice, water, wax or paraffin.” (See Application ¶ 103.) If the Applicants have misunderstood the rejection, they kindly request the opportunity to discuss this matter with the Examiner by telephone.)

Claim Rejections under 35 U.S.C. § 102

Claims 15 and 73 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,572,637 to Yamakazi et al. (herein “Yamakazi”). Both claims are novel, however, because Yamakazi fails to teach or suggest the elements recited in the amended claims. For example, claim 15 recites “a heat sink thermally coupled to said at least one radiation source and said handle and configured to conduct heat from said at least one radiation source to said handle.” Claim 73 recites a “handle [that] comprises a heat sink configured to remove heat from said at least one radiation source to an operator’s hand.” Yamakazi does not disclose such a configuration, does not disclose removing heat from a handle, and does not disclose removing heat to an operator’s hand.

Instead, Yamakazi discloses a heat sink that is cooled by a fan 14 (See Yamakazi, Fig. 2) --apparently by air. The only mention of ventilation in Yamakazi is the vent formed by the cylindrical adjuster 20. (See col. 3, lines 14-15 (“The cylindrical adjuster 20 has a notch ‘b’ made in the vicinity of the open end for ventilation.”)) Thus, the fan 14 appears to force the air across a heat sink 18, and out of a vent formed by the cylindrical adjuster 20. The cylindrical adjuster 20, however, is located on the face of the device – not in a handle. Similarly, the fan 14 is located in the head of the device, and not in a handle. None of the heat removal elements of Yamakazi are disclosed as being in or associated with a handle.

Furthermore, there is no disclosure that any part of the outer casing 11 removes heat. The only disclosure of heat removal is associated with the fan and ventilation system. The material that casing 11 is made from is not disclosed, and thus it is not known whether the casing is an insulating material or a conductive material.

To supply the missing elements, the Examiner states that “the handheld unit inherently is integral to the heat removal and any body in contact with the handheld unit would ‘receive’ heat from the unit.” There is no support for that conclusion, however. Yamakazi does not disclose such a mechanism of heat removal, and that mechanism is inconsistent with what Yamakazi does explicitly disclose.

Further, it is not the case that such heat removal is inherent in all devices with a handle. For example, the device could be made of an insulating material that inhibits the conduction of heat. Both rubber and plastic are commonly known to be capable of serving as insulators. The thermal conductivity of most polymers is around $4.1 \times 10^{-4} \text{ cal sec}^{-1} \text{ cm}^{-1} \text{ K}^{-1}$ (this is equivalent to about $0.1 \text{ Btu/ft}^{-1} \text{ hr}^{-1} \text{ F}^{-1}$, which is midpoint of the range of thermal conductivity values cited by Rodriguez). See Rodriguez, Principles of Polymer Systems, 2nd edition, McGraw Hill, New York, 1982, p. 266. In comparison, aluminum, which is named as an exemplary heat sink material in the application (see paragraph 0094 of the published application), is *approximately one-thousand times more thermally conductive* than a typical polymer (i.e., about $5 \times 10^{-1} \text{ cal sec}^{-1} \text{ cm}^{-1} \text{ K}^{-1}$ as shown in Bird, Stewart, Lightfoot, Transport Phenomena, John Wiley & Sons, Inc., New York, 1960, p. 249). (The cited Rodriguez and Bird references were provided as exhibits A and B to the Applicant’s Amendment and Response dated March 30, 2006.)

Accordingly amended claims 15 and 73 are novel and patentable over Yamakazi.

Claim Rejections under 35 U.S.C. § 103

Claims 1, 2, 4-8, 10-14, 16-17, 19-20, 22 and 56-72

Claims 1, 2, 4-8, 10-14, 16-17, 19-20, 22 and 56-72 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,094,767 to Iimura in view of U.S. Patent 6,273,884 to Altshuler et al. (herein “Altshuler”). (Claims 7 and 16-17 were rejected over Iimura in view of Altshuler and further in view of either Yamakazi or U.S. Patent 5,445,608 to Chen et al. However, the same reasoning below applies to those rejections as well.) All of the rejected claims, however, are patentable, because (1) Iimura in combination with Altshuler does not include all elements recited in the claims, and (2) there is no suggestion or motivation to modify

the cleaning heads of Iimura with the total internal reflection mechanism of Altshuler or other aspects of Altshuler.

Each of the rejected independent claims share a similar characteristic, i.e., at least a portion of the radiation does not pass unless the apparatus is in contact with a surface such as, for example, skin. The rejected independent claims are summarized as follows.

- Independent claim 1 is directed to an apparatus for treating the skin, comprising an applicator having at least one protuberance comprising a skin-contacting surface, and at least one optical radiation source. The apparatus also includes a total internal reflection mechanism *to prevent a portion of the radiation from passing through said skin-contacting surface unless in contact with the skin.*
- Independent claim 10 is directed to an apparatus for treating the skin, wherein “a skin contacting end of each protuberance has total internal reflection for the radiation when not in contact with the skin, but *passes radiation to the skin when in contact therewith.*”
- Independent claim 61 is directed to an applicator having at least one protuberance comprising a skin-contacting surface. The applicator includes “a total internal reflection mechanism coupled to said skin-contacting surface to prevent at least a portion of the radiation from passing through said skin-contacting surface *unless in contact with a surface* having an index of refraction approximately greater than or equal to the index of refraction of the skin contacting surface.”
- Independent claim 68 is directed to an apparatus for treating skin using an optical radiation source, “wherein at least a portion of the radiation passes to the skin *only when the surface contacts the skin.*”

Iimura does not teach these elements, and Iimura in combination with Altshuler does not teach all elements of the claims. Furthermore, there is no stated motivation to combine the references. Iimura actually teaches that safety mechanisms are not required, and does not mention other benefits to which Altshuler’s teachings would apply, such as, for example, power conservation. Additionally, the principle of operation of Iimura is fundamentally different than that of Altshuler. Thus, there is no motivation to combine Iimura and Altshuler.

Iimura discloses various cleaning heads that use ultraviolet (UV) light to activate a photocatalyst contained in the bristles or brushes of the cleaning heads. The heads can be used for many purposes, including as “brushes, vacuum cleaners and mops” for use on “a floor, a

wall, a tile, a carpet, a bathtub, a sink, cooking utensils and a toilet pot.” (See Iimura col. 1, lines 10-16.)

There is no stated motivation to combine the teachings of Iimura with Altshuler, because there is no teaching in Iimura that safety of the devices could or should be enhanced or that some other benefit may be derived from Altshuler’s teachings when combined with Iimura. To the contrary, Iimura explicitly teaches that the cleaning heads are safe. For example, Iimura discloses the preferred photocatalysts for use with the cleaning heads and notes that “titan oxide” is both safe and harmless. (See Iimura col. 6, lines 24-30 (stating that “a safety or a harmless to a human body is certified, as it has been used for a long time safely for adding in cosmetics and foods.”) There is no further mention in Iimura of safety or a need to enhance safety, for example, by preventing unwanted emission of UV radiation from the cleaning heads.

Furthermore, Iimura’s cleaning heads have a fundamentally different principle of operation from the devices of Altshuler. While Altshuler discloses, for example, embodiments that include protuberances through which the radiation passes directly, Iimura does not appear to disclose such a mechanism of operation. Instead, the UV radiation in Iimura passes directly between the brushes of the cleaning heads, and irradiates from the head/brush support itself. The head/brush support is explicitly disclosed as being “transparent” in the dental brush embodiments of Iimura – presumably for the purpose of irradiating the photocatalyst contained in the brushes. ((See Iimura col. 11, lines 38-48.) Furthermore, FIGS. 10-12 explicitly show that the radiation in other disclosed embodiments is irradiated directly from the head and not the brushes.

Although Iimura (which presumably was translated from a foreign language) is sometimes difficult to comprehend, Applicants are unable to find an embodiment or other disclosure that explicitly shows the radiation emitted from the bristles directly. This appears to be because the brushes themselves are partially composed of the photocatalyst material and thus, may not be capable both of transmitting UV light and serving as the photocatalyst at the same time. (See Iimura col. 4, lines 27-35.) This is illustrated by FIGS. 5a and 5b and the associated text. Those figures indicate that the brushes are a fiber made of a metal, rubber, resin or plastic

core that is covered in a sheath that is embedded with the photocatalyst particles. Thus, the brushes do not appear to be designed to, and may not be capable of, transmitting the UV light.

Therefore, without modifying the fundamental operation of Iimura, there would be no motivation to apply the teachings of Altshuler. As discussed in the Manual of Patent Examining Procedure §2143.02 Section VI, “[i]f the proposed modification or combination of prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious.” Adding the total internal reflection mechanism recited in amended claim 1 would change the principle of operation of the cleaning heads disclosed in Iimura. Accordingly, Iimura cannot be combined with Altshuler to render amended claim 1 obvious.

Claims 2, 4-8, 11-14, 16-17, 19-20, 22, 56-60, 62-67 and 69-72 all depend from one of claims 1, 10, 61 and 68, and are thus patentable over the cited art for at least the same reasons that claims 1, 10, 61 and 68 are patentable. Accordingly, Claims 1, 2, 4-8, 10-14, 16-17, 19-20, 22 and 56-72 are novel and patentable over Iimura in combination with Altshuler.

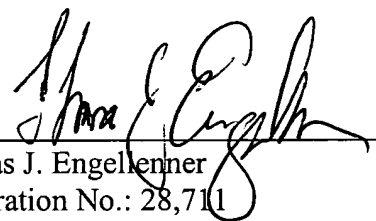
CONCLUSION

In summary, the above-identified patent application has been amended and reconsideration is respectfully requested for all the reasons set forth above. In the event that the Examiner deems that the amendments and remarks do not overcome the stated grounds for rejection, the Applicants kindly request that the Examiner telephone the undersigned representative to discuss any remaining issues.

Respectfully submitted,

NUTTER McCLENNEN & FISH LLP

Date: November 22, 2006



Thomas J. Engellemer
Registration No.: 28,711
Attorney for Applicants
World Trade Center West
155 Seaport Boulevard
Boston, MA 02210-2604
Tel: (617) 439-2948
Fax: (617) 310-9948